Ask the Historian

The Origin of the Rubber Policeman

by William B. Jensen

Question

What is the origin of the rubber policeman and why is it called a policeman?

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Answer

In classical wet gravimetric analysis it is essential, after precipitating the chemical substance of interest as a stable, insoluble compound, to successfully transfer all of the precipitate to the filtration funnel for separation from the supernatant liquid. Usually this is done using a stream of distilled water from a wash bottle. However, particularly dense precipitates may become compacted at the bottom of the precipitation beaker and require mechanical loosening or, in the case of light precipitates, may become dispersed on the walls of the beaker. In using a glass rod to pry loose a compact precipitate, one runs the risk of accidently poking a hole in the bottom of the beaker, whereas use of a glass rod to collect dispersed precipitate is ineffective and may result in scratching of the beaker wall. These problems were particularly acute prior to the introduction of Pyrex glassware in the early 20th century, before which chemists had to make use of paper-thin glassware made from relatively soft potash or lime glass *(1)*.

To overcome these problems, analytical chemists introduced a variety of devices. Thus the 19th-century German chemist, Carl Remigius Fresenius, in his classic manual of quantitative analysis, recommended the removal of any dispersed precipitate from the beaker walls using *(2)*:

> ... a feather prepared for the purpose by tearing off nearly the whole of the plumules, leaving only a small piece at the end which should be cut perfectly straight.

An early description of our current method of choice—the rubber policeman—may be found in the 1910 edition of J. C. Olsen's textbook of quantitative analysis *(3)*:

> ... particles adhering to the glass must be removed by means of a so-called policeman, which is made by inserting the end of a rather thick large-sized glass stirring-rod into a short piece of rubber tubing. The rubber tube should be left protruding slightly beyond the end of the glass tube and sealed together with a little bicycle [i.e. rubber] cement.

Olsen, however, does not appear to have been the inventor of this device as the chemical catalogs in the Oesper Collections indicate that prefabricated rubber policemen were being offered for sale by the Henry Heil Company of St. Louis as early as 1904 *(4)*.

Unfortunately, neither Olsen nor the catalog for the Heil Company provided an explanation for why this device was called a policeman, though at least two speculative possibilities suggest themselves:

- It policed or protected the beaker from breaking or scratching.
- It policed the beaker walls by gathering up any stray or escaped particles of precipitate.

An entry in the 1937 edition of *Hackh's Chemical Dictionary (5)* under "platinum policeman", defined as "a platinum–iridium claw that fits over a glass rod and is used to hold a quantitative filter during ignition", suggests that the second of these speculations is probably the correct one. Just as the purpose of the rubber policeman was to prevent the escape of any stray precipitate, so the purpose of this claw device was to prevent the escape of any stray filter paper from the crucible during the ignition process due to thermal updrafts from the burner.

Literature Cited

1. Jensen, W. B. The Origin of Pyrex. *J. Chem. Educ.* **2006,** *83,* 692–693.
2. Fresenius, C. R. *A System of Instruction in Quantitative Analysis,* 2nd ed.; Wiley: New York, 1881; p 80.
3. Olsen, J. C. *A Text-Book of Quantitative Analysis,* 4th ed.; Van Nostrand: New York, 1910; pp 55–56. This sentence is missing from the 3rd edition of 1908 suggesting that the device was still relatively novel.
4. *Illustrated Catalogue and Price-List of Chemical Apparatus;* Henry Heil Chemical Co.: St. Louis, MO, 1904; item 8179/4, p 381.
5. Hackh, I. W. D.; Grant, J.; Eds. *Hackh's Chemical Dictionary,* 2nd ed.; Blakiston's Son & Co.: Philadelphia, 1937; p 738.

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